

Patent
72478-3400

REMARKS

The Office Action raised an issue with regards to the Declaration. To address this issue, applicant is hereby submitting a new proposed Reissue Declaration that will be signed by the inventors as opposed to the Assignee.

Applicant's patent inadvertently claimed more than applicant had a right to claim in defining the protective layer as being also inclusive of a (100) face orientation wherein applicant, in combination with the other elements of the invention, should more properly have defined a protecting layer with a (110) face orientation on the dielectric glass layer, such as a (110) face orientation of a magnesium oxide. Accordingly, independent Claims 1, 5, 21 and 26 now define a (110) crystal face orientation. Additionally, the new Claims 28-57 also define a (110) face orientation of magnesium oxide. This error was not recognized during the prosecution of the original U.S. Patent No. 5,993,543.

If there are any further issues with regards to the Declaration, the undersigned attorney would appreciate a telephone conference to address this formality issue.

With a resolution of the reissued Declaration, it is believed that the subject matter of Claims 2-4, 14-19, 29-31, 41-46 and 48-54 should be allowable. It is requested that the rewriting of these claims to reflect this allowability be held in abeyance until the following is considered.

The Office Action maintained a rejection of Claims 1, 5-13, 20, 28, 32-40, 47 and 55-57 as unpatentable under 35 U.S.C. §103 in view of the *Shinoda et al.* (European Publication 279744) in view of the *Lee et al.* (WO 96/32520 Publication) and the *Talvacchio* (EP Publication 364068).

The Office Action relied upon the *Shinoda et al.* for suggesting a plasma display panel with a magnesium oxide layer. The Office Action noted that a charge gas of a mix of xenon with

Patent
72478-3400

an inert gas would be used with a gas pressure of around 600 Torr. The illustrative example in Figure 5 suggests a pressure of 650 Torr at Column 4, Line 54. Additionally, the *Shinoda et al.* reference suggests in Figure 3, that the charge gas would have an xenon content of 0.2%. With the use of a three composition gas at a lower pressure range of 400 Torr, it was stated as follows in Column 5, Lines 14-19:

It can be observed that a xenon gas content below 10% is effective to achieve adequately low operation voltages. If low operation voltages are particularly desired, a xenon gas content of 8% maximum is preferred.

(Underline added)

As can be appreciated, there is no particular discussion of any preferred crystalline structure for magnesium oxide in the *Shinoda et al.* reference.

The Office Action, however, relied upon the *Lee et al.* reference to teach an electron beam deposition of magnesium onto a substrate, per se. Thus, it was contended that a person of ordinary skill would utilize the electron beam deposition of *Lee et al.* to deposit a magnesium oxide layer on a front plate of the *Shinoda et al.* disclosure. As can be appreciated, the *Lee et al.* publication did not teach nor suggest a particular orientation of the crystal grown layer and was, in fact, directed to a multilayer anti-reflective optical coating, for example as used on a lens, which can be determined from Pages 13-15 of the *Lee et al.* disclosure.

In this regard a lens would be hand washed, ultrasonically cleaned, soaked in deionized water and spun dry. *Lee et al.* would also suggest a coating temperature of 200°C and sets forth the refractive indices for a five layer coating, none of which suggests magnesium oxide.

Further reviewing Page 8, Lines 11-13, the Office Action is wrong in contending that the *Lee et al.* reference discloses a magnesium oxide layer, since it only discloses a magnesium fluoride coating. The coatings disclosed could be primarily directed to providing a multilayer

Patent
72478-3400

optical coating to prevent reflection, for example, on a lens substrate. As noted, the substrate can be heated to approximately 200°C as seen on Page 5, Lines 28-29.

Thus, the Office Action is incorrect in contending that the *Lee et al.* reference teaches a magnesium oxide protective layer. It actually teaches a magnesium fluoride anti-reflection coating layer, which would be generally one of many layers that form an approximately quarter wavelength design, as known in the optical field. This is consistent with the desires set forth on Page 2, Lines 28-29, to provide a thin film formation for low scattered and low loss films.

The Office Action further relied upon the *Talvacchio* reference to contend that magnesium oxide could be deposited on a substrate with varying crystal orientations. As can be determined from the Title of this invention, A Method of Depositing an Oxide Superconductor on a Substrate was discussed and taught. More specifically, it was noted that the substrates of a single crystal of SrTiO₃ could be coated with a single crystal of magnesium oxide (100). The magnesium oxide provides basically a buffer layer because in microwave applications, the pattern of oxide superconductors have a tendency to react strongly with sapphire, thereby degrading the superconductor film.

It should be noted that the orientation of the magnesium oxide appears to be dictated by the specific sapphire orientation of the substrate, particularly at a deposition temperature of 800°C. As noted on Page 3, Lines 28-45, different orientations of the magnesium oxide film would occur at an ultra high vacuum of 10⁻⁹ Torr. Basically, as noted in the Abstract of the *Talvacchio* reference, a thin buffer layer to prevent an interaction between the subsequent oxide semiconductor and a sapphire substrate is provided with the magnesium of the buffer layer being any one of a crystal orientation of (111), or (100) or (110) orientation. See also, dependent Claim 4 and the statement on Page 4, Lines 12-14:

72478.3400PRICE/IRV494692

Patent
72478-3400

Table 1 includes data for Y_2O_3 -stabilized cubic ZrO_2 (YSZ). Films grown of single-crystal YSZX substrates have properties similar to those grown on MgO (100). Therefore YSZ is as good a candidate for a buffer layer on sapphire as MgO; however, satisfactory layers of YSZ have not yet been grown epitaxially.

Thus, magnesium oxide (100) appears to be the mode of crystallinity suggested in the *Talvacchio* disclosure.

As set forth in *In re Kahn*, 441 F.3d 977, 987-988 (Fed. Cir. 2006):

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. [*Graham v. John Deere Co.*, 383 U.S. 1, 13-14 (1966).]

To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law. . . .

* * *

A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as "the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. . . . The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. This requirement is as much rooted in the Administrative Procedure Act [for our review of Board determinations], which ensures due process and non-arbitrary decisionmaking, as it is in §103.

(underline added)

Patent
72478-3400

Our invention permits a formation of a protective layer of an alkaline earth oxide with a (110)-face orientation at a low glass substrate temperature of 150°C. The advantages of such a face orientation, for example, magnesium oxide is set forth on Column 6 and as noted on Column 10, line 53 through 55, these advantages are also achieved in providing a (110)-face orientation.

The Office Action acknowledged that the *Lee et al.* publication No. WO 96/32520 did not teach nor suggest an orientation of a crystal grown layer as set forth in the claims. It was contended, however, that in the absence of any unexpected results that it would simply be obvious to provide a (110)-face orientation on a plasma display panel protective layer of approximately 5000 Å.

However, the *Lee et al.* reference is directed to a thin coat multi-layer anti-reflection coating to provide low scatter and low light lost. It does not address nor recognize the problems of a (111)-face orientation protective layer of approximately 5000 angstroms in thickness for a plasma display panel.

The U.S. Patent Office is cognant that frequently the recognition of the problem can be an ingredient in the invention, as noted in the case of *In re Zukor*, 111 F.3d 887, 42 USPQ2d 1476, 1479 (Fed. Cir. 1977):

Finally, to say that the missing step comes from the nature of the problem to be solved begs the question because the Board has failed to show that this problem has been previously identified anywhere in the prior art. See *In re Spinnable*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969) ("[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified."

Patent
72478-3400

Applicant respectfully traverses this current rejection and as can be seen throughout the present specification, a conventional protective layer of magnesium oxide is formed by a vacuum vapor deposition method and has produced a (111)-crystal face orientation that has not been as satisfactory in its performance characteristics as would be desired in the current field of plasma display panels, while the present invention provides a superior improved performance. Certainly there can be no question that this is a highly competitive field with numerous scientists and engineers attempting to provide commercially viable plasma display panels.

As noted on Column 6 of our specification, the crystals of an alkaline earth oxide are purposefully grown in a slow fashion to form a dense protective layer of a different orientation than that of the previous conventional comparison examples. See for example, the comparative Example 15 in Table 2, and Examples 67 and 69 in Table 4 of our present disclosure. These examples set forth the results with the (111)-crystal face orientation.

The present invention with a (110)-crystal face orientation has an advantage of providing a very dense formation of a protective layer to be able to protect the dielectric glass layer with improved sputtering resistance. Additionally, our present invention assists in reducing the driving voltage of the plasma display panel and it can improve the panel brightness because of its large emission coefficient (γ value) of secondary electrons.

The conventional (111)-face orientation had a tendency to react with water content in the air to form hydroxides which is a known problem in plasma display panels. The protective layer of our present invention significantly reduces and removes this problem.

A magnesium oxide protective layer with a conventional (111)-face orientation can have a heat resistance up to 350°C. Our improved (110)-face orientation protective layer will have a significantly higher heat resistance and can enable heat treatment to be performed at

Patent
72478-3400

temperatures of about 450°C. Finally, the aging process time, which is important in extending the life of a plasma display panel, can be considerably shortened in the time period after the bonding of the substrate panels compared to that of the prior art configurations.

The advantageous results of our present invention can be seen, for example, in Examples 18-22, 25, 26, 30, 31, and 34 among others.

The present invention provides a particular desired (110) face orientation of the crystal structure for magnesium oxide with a sufficient amount of magnesium oxide deposited to form approximately 5000 angstroms of a protective layer at a substrate temperature of approximately 150°C.

As noted in *In re Kahn (supra)*, the obviousness test is based upon whether a person of ordinary skill at the time of the invention would have found our claims as being obvious in view of a number of diverse references. The relied upon references are a gas discharge display panel, an anti-reflective optical coating, and a method of depositing an oxide superconductor subject to microwave energy.

Attached hereto are the following documents, all of which are publications after our present invention date (not prior art) and are presented to assist in determining the level of skill at the time of the present invention.

Document 1: IDW '98, Proceedings of The Fifth International Display Workshops, PDP3-5, pp. 523-526.

Document 2: Electronic Journal, Issue of October, 1998, pp 83-84.

Document 3: Japanese Patent Application Publication No. 10-106441 (filing date: October 2, 1996).

Patent
72478-3400

Document 1 shows in Fig. 4 the results of an experiment in which the sputtering rate was measured on MgO thin films with the orientations (111), (220) and (200). The experiment results indicate that the MgO thin film with orientation (220) has a lower sputtering rate than the MgO thin films with orientations (111) and (200). The experiment results support the fact that a MgO thin film with an orientation (110) is denser and higher in sputtering resistance than the MgO thin films with orientations (111) and (100).

Document 2 recites on Page 84, right column:

"Mr. Kunio Yoshida of Hiroshima University made a presentation on the MgO film valuation method and characteristics. Samples A and B manufactured by the EB evaporation method and Sample C manufactured by the sputtering method are orientations (111), (110), and (100), respectively. According to the results, Sample B was the highest in the γ characteristics, followed by Samples C and A in the order. With the increase of the γ characteristics, the voltage decreases, and the density of Ne ions increases. For this reason, with respect to the PDP aging characteristics, brightness, and light-emitting efficiency, Sample B was the most excellent, followed by Samples C and A in the order. Also, the sample with orientation (110) was 20V lower than the sample with orientation (111) in the sustain voltage, and the light-emitting efficiency of the sample orientation (110) was 1.8 times that of the sample with orientation (111)."

Document 3 recites in its Abstract that the invention is aimed to increase the sputtering resistance of the protective layer of the dielectric layer to increase the operating life, and that a magnesium oxide film with orientation (110) is provided as a layer for protecting the surface of the dielectric layer.

We believe that the above description in the Documents 1-3 clearly supports the advantageous effect of the present invention that a MgO layer with (110)-face orientation is dense, has high sputtering resistance, and emits a large amount of secondary electrons, compared with MgO layers with (111)- or (100)-face orientation.

Patent
72478-3400

It is respectfully submitted that Documents 1, 2 and 3 represent a higher average of skill than that of an ordinary person of skill in our particular field. These documents indicate a significant finding of the advantages of our present invention in seminars, publications and even patent applications after our invention.

Accordingly, this provides an objective reference to permit the Examiner to avoid the use of hindsight and make a determination of what a person of ordinary skill in the field would have considered to be a significant contribution in 1995.

In view of the above submissions, it is believed that the case is now in condition for allowance and an early notification of the same is requested.

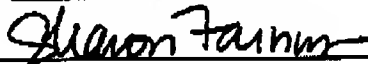
If the Examiner believes that a telephone interview will assist in the prosecution of this matter, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

I hereby certify that this correspondence is being
transmitted via facsimile to the USPTO at
571-273-8300 on September 27, 2006.

Very truly yours,

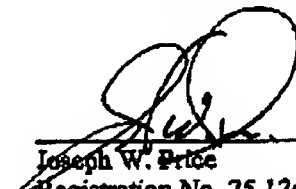
SNELL & WILMER L.L.P.

By: Sharon Farnus



Signature

Dated: September 27, 2006



Joseph W. Price
Registration No. 25,124
600 Anton Boulevard, Suite 1400
Costa Mesa, California 92626-7689
Telephone: (714) 427-7420
Facsimile: (714) 427-7799